

ABSTRACT

Title of Dissertation: PREDICTING UNPROTECTED SEX
AMONG ADOLSECENTS: PARENTAL
KNOWLEDGE AND CALLOUS-
UNEMOTIONAL TRAITS

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Risky sexual behavior, including engagement in sexual intercourse without a condom, is common among adolescents and can result in many negative consequences. The aim of the present study was to conduct a longitudinal investigation of predictors of adolescents' likelihood of engaging in sex without a condom. Past research has established that parental knowledge, or the extent to which parents know information about their children's peers, whereabouts, and activities, robustly predicts youth's engagement in risky sexual behavior. However, among youth with elevated levels of callous-unemotional (CU) traits (e.g., the callous use of others, absence of empathy, lack of guilt, and constricted emotions), parenting practices and parent-focused interventions are typically less potent as predictors of subsequent behavior. Across three different logistic regression models which each conceptualized "parental knowledge" in a different way (though adolescent-report, parent-report, and through the discrepancy across reporters), this study examined parental knowledge, CU traits,

and the interaction between these variables as predictors of adolescents' subsequent engagement in sex without a condom. It was hypothesized that CU traits would moderate the relation between parental knowledge and engagement in sex without a condom, such that parental knowledge would be protective against engaging in unprotected sex only for those adolescents with lower levels of CU traits. Results indicated that, regardless of level of CU traits, adolescents who perceived their parents to possess greater knowledge were less likely to engage in unprotected sex. A higher parent report of parental knowledge was also related to decreased likelihood of engaging in unprotected sex, but, counter to the study's hypothesis, parent-reported parental knowledge was only significant for adolescents with the *highest* levels of CU traits. This finding remained significant after controlling for adolescents' engagement in unprotected sex in the year prior. The discrepancy between parent- and adolescent-reports of parental knowledge and the interaction between discrepancies and CU traits were not significant predictors of adolescents' subsequent engagement in sex without a condom. Results from this study highlight the importance of considering both parent and adolescent perceptions of parental knowledge and have important implications for future prevention and intervention efforts.

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by

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Table of Contents

Acknowledgements	ii
Table of Contents	iii
List of Tables	iv
List of Figures	v
Chapter 1: Introduction	1
Chapter 2: Research Design and Method.....	16
Chapter 3: Results	24
Chapter 4: Discussion	31
Bibliography	53

List of Tables

- Table 1: Correlations, Means, and Standard Deviations of Study Variables
- Table 2: Means, Standard Deviations, and Percentages for Key Study Variables across Groups of Adolescents who Did and Did Not Engage in Unprotected Sex in the Past Year
- Table 3: Summary of Logistic Regression Results from Model 1
- Table 4: Summary of Logistic Regression Results from Model 2
- Table 5: Summary of Logistic Regression Results from Model 3
- Table 6: Gender Differences across Key Study Variables
- Table 7: Summary of Logistic Regression Results from Model 1, Controlling for Prior Engagement in Unprotected Sex
- Table 8: Summary of Logistic Regression Results from Model 2, Controlling for Prior Engagement in Unprotected Sex
- Table 9: Summary of Logistic Regression Results from Model 3; Controlling for Prior Engagement in Unprotected Sex

List of Figures

Figure 1: Graph of Significant Interaction between Parent-reported Parental Knowledge and Adolescent-Reported CU Traits as a Predictor of Adolescents' Likelihood of Engaging in Sex without a Condom

Chapter 1: Introduction

Risky Sexual Behavior among Adolescents

Adolescence is an important developmental period marked by many significant changes, often including the initiation of sexual activity. Data from several longitudinal studies suggest that while approximately 6% of United States youth have had sex prior to beginning high school (measured at age 13), approximately 47% of all high school students report engaging in sexual activity, indicating that the initiation of sexual activity occurs for many youth during the high school years (CDC, 2013). For some, adolescence is also associated with risky sexual behavior, often operationalized in research studies as a greater number of sexual partners or condom non-use during intercourse (Schuster, Mermelstein, & Wakschlag, 2012). Indeed, teenagers are more likely than other groups to engage in sex without a condom (CDC, 2013). For adolescents, predictors of engaging in sex without a condom include low condom use self-efficacy, a lack of condom use goals, and alcohol use, among others (Black, Sun, Rohrbach, & Sussman, 2011; Haley, Puskar, Terhorst, Terry, & Charron-Prochownik, 2013; Khan, Berger, Wells, & Cleland, 2012). Although rates of unprotected sex have been declining in recent decades, the percentage of high school students who engage in sex without a condom is still high, with estimates as high as 41% of sexually active teenagers reporting that they did not use a condom the last time they had sex (CDC, 2013).

Given the frequency of unprotected sexual intercourse, rates of sexually transmitted infections (STIs) are high among adolescents. Although estimates vary

widely, the CDC (2013) reported that nearly 10,000 adolescents (ages 13-24) are diagnosed with an HIV infection, and nearly half of the 20 million new STIs each year are among young people ages 15-24. The lifetime cost of treating eight of the most common STIs contracted in just one year is \$15.6 billion, with STIs which require lifelong treatment and care (such as HIV) being the most costly (CDC, 2013).

In addition to being at risk for STIs, adolescents who engage in unprotected sex are more likely to experience unplanned pregnancy. Rates of teenage pregnancies are relatively high (126.6 pregnancies per 1,000 for sexually active women between 15-19 years of age in 2010; Kost & Henshaw, 2014), and adolescents ages 15-19 have the highest rates of unplanned pregnancies as compared to other age groups when these rates are calculated to only include sexually active people (Finer, 2010). In 2013, the abortion rate among women ages 15-19 in the United States was 14.7 abortions per 1,000 women (Kost & Henshaw, 2014), and approximately 273,000 babies were born to teenage girls ages 15-19 (CDC, 2013). Thus, risky sexual behavior among adolescents, such as engaging in unprotected sexual intercourse, can have serious negative consequences at the individual level and, more broadly, is a serious public health concern.

Understanding Adolescent Risky Sexual Activity

The risks associated with adolescent engagement in unprotected sex are great, and therefore, significant research efforts have focused on understanding adolescent sexual risk behavior. At a theoretical level, researchers have proposed that a comprehensive understanding of adolescent development and adolescent sexual risk

behavior must involve examining a broad range of factors across the multiple systems which influence adolescent development (Brofenbrenner, 1986; Kotchick, Shaffer, Forehand, & Miller, 2001). Specifically related to adolescent sexual risk behavior, Kotchick and colleagues (2001) recommend taking a multisystemic approach that integrates the effects of variables within three primary systems to form a more comprehensive understanding. The authors propose that the self-system, the family system, and the extra-familial system are most important to understanding adolescent sexual risk behavior. Specific variables within the self-system which the extant research has identified as important include biological factors (e.g., pubertal development, gender), psychological factors (e.g., knowledge of risks, self-efficacy, religiosity), and behavioral factors (e.g., delinquency, engagement in substance use). Within the family system, both family structure variables (e.g., divorce, socioeconomic status) and family process variables (e.g., relationship quality, communication) are significant predictors of engagement in risky sexual behavior. Finally, within the extra-familial system, important variables to consider include peer relationships and the school environment. The authors recommend an increased focus on how variables across these systems interact with one another to predict behavior as well as further investigation of social and familial system variables as important future directions for research on adolescent risky sexual behavior (Kotchick et al., 2001).

Parental Knowledge and Adolescent Risky Sexual Activity

Within the family system, the parenting context is a unique predictor of adolescent risk behavior, and it plays a key role in predicting risky sexual behavior

among adolescents (Kincaid, Jones, Sterrett, & McKee, 2012). Specifically, positive parenting behaviors, increased social and emotional support, and high parent-child relationship quality can protect youth from drug use and risky sexual activity, whereas poor parental monitoring, low supervision, and low parental knowledge are associated with higher rates of substance use, more externalizing behaviors, and risky sex among youth (e.g., Barnes, Reifman, Farrell, & Dintcheff, 2000; Ellickson, Perlman, & Klein, 2003; Kalina et al., 2013; Killoren & Deutsch, 2014; Kincaid et al., 2012; Li, Stanton, & Feigelman, 2000; Reynolds, MacPherson, Matusiewicz, Schreiber, & Lejuez, 2011; Wills, Resko, Ainette, & Mendoza, 2004).

In a review of parenting and adolescent sexual risk behavior, Kincaid and colleagues (2012) highlight the many ways in which parents influence sexual behavior among adolescents, including modeling through their own behavior and shaping youth's expectations about sex. The authors also note that forms of parent-imposed behavioral control are especially robust and often-studied predictors of adolescent risky sexual behavior (Kincaid et al., 2012). Parents typically exercise behavioral control by setting limits on adolescent's behavior, including where and with whom they may be (Pomerantz & Eaton, 2000). *Parental knowledge*, which can be characterized as the extent to which parents know about their children's activities, whereabouts, and peer friendships is often used as an indirect measure of behavioral control (Kincaid et al., 2012; Reynolds et al., 2011; Stattin & Kerr, 2000; Tebes et al., 2011), and low levels of parental knowledge are associated with increased risky behaviors among youth, including risky sexual behavior (e.g., Sneed, Strachman, Nguyen, & Morisky, 2009).

Adolescent- versus Parent- Reports of Parental Knowledge: The Importance of Discrepancies between Reporters

The effect of parental knowledge on youth risk behavior can be nuanced, however, depending on whether it is assessed via parent- versus child/adolescent- perspectives (e.g., Cottrell et al., 2003). Parental knowledge is typically measured through either parent- or child/adolescent- report, and many studies have assessed parental knowledge through multiple reporters, thus capturing the unique individual perceptions of parental knowledge from each observer's point of view. Findings suggest that, on average, adolescents report lower levels of parental knowledge than do their parents (Kerr, Stattin, & Burk, 2010). Additionally, parent- and adolescent- reports of parental knowledge sometimes differentially predict risk behavior involvement. For example, Padilla-Walker and colleagues (2008) conducted a study on the association between parental knowledge of their emerging adults (aged 18-25) and these emerging adults' engagement in risk behavior. This study utilized maternal, paternal, and child reports of parental knowledge, and outcome variables included alcohol use, drug use, and risky sexual behavior (operationalized as number of sexual partners). Both child- and parent-reported maternal knowledge were negatively related to alcohol use, while the effect of parent-reported and child-reported paternal knowledge did not reach significance. In contrast, parent- and child- reports of maternal and paternal knowledge were all significantly negatively related to drug use. Finally, only parent- report of maternal knowledge showed a significant negative relation with engagement in risky sexual behavior. Findings from this study are an example of research which has found that different reporters' perceptions of parental

knowledge are uniquely relevant for predicting engagement in particular types of risk behaviors.

There is great value in the unique perceptions of parental knowledge captured by parent- and adolescent report. Perceptions often differ across reporters, and each report can be uniquely related to adolescent outcomes and behavior. Notably, the significant differences in parent- versus child- report are not seen as poor measurement or error in reporting, but rather, they capture meaningful information about the parenting construct from both perspectives. These differences may also indirectly reflect information about the parent-child relationship and parental involvement (De Los Reyes, 2011; Reynolds et al., 2011). For example, mother-child discrepancies in perceived child behavior problems are positively related to mother-child conflict (De Los Reyes and Kazdin, 2006), and parent-child relationship quality is also a significant predictor of discrepancies between parent and child reporting on children's behavior (Treutler & Epkins, 2003). Past research has found that larger discrepancies between parent and child reports of parental knowledge are associated with increased risk-taking behavior among youth, including drug use and risky sex (Cordova, Huang, Lally, Estrada, & Prado, 2014; Reynolds et al., 2011). In other words, more divergent reports between parent and child regarding how much a parent knows about his or her child's activities and whereabouts is positively related to increased youth risk behavior engagement (Reynolds et al., 2011).

Thus, there is important predictive utility in incorporating both reports separately (parent and adolescent), as well as the discrepancy between parent- and adolescent- reports, in predicting youth outcomes and risk behaviors. Importantly,

those who study parent-adolescent reporting discrepancies have emphasized that the meaning of parent-adolescent congruence or discrepancy can vary as a function of both the construct on which they are reporting (e.g., parental knowledge, family closeness, etc.) and the outcome to which these reports are linked (e.g., depression, delinquent behavior, etc.) (Laird & De Los Reyes, 2013). When applying this perspective to parental knowledge and adolescent risky sexual behavior, a greater discrepancy in parent- and adolescent- reports may put an adolescent at risk for engagement in risky sexual behavior when the parent reports higher parental knowledge than the adolescent reports.

Callous-Unemotional Traits as Moderators of the Relation between Parenting and Risk Behavior Engagement

In addition to parental knowledge and discrepant parent-adolescent views about parental knowledge, self-system variables (Kotchick et al., 2001), including temperamental characteristics of the adolescent are important to consider as predictors of engagement in risky behavior. Callous-unemotional (CU) traits, such as the callous use of others, an absence of empathy, a lack of guilt, and a constricted range of emotions consistently predict later engagement in a range of externalizing behaviors and have been shown to moderate the relation between parenting practices and delinquent behavior. Children with a callous and unemotional interpersonal style or elevated levels of CU traits have been identified as an important subgroup of children who go on to display a chronic pattern of risky, antisocial, and delinquent behavior in adolescence (Frick, Blair, & Castellanos, 2013; Frick, Cornell, Barry, Bodin & Dane, 2003; Frick, Ray, Thornton, & Kahn, 2013; Frick, Stickle,

Dandreaux, Farrell, & Kimonis, 2005; Frick & White, 2008; Loney, Taylor, Butler, & Iacono, 2007). In addition to antisocial behavior, CU traits are also associated with substance-related delinquency (Taylor & Lang, 2006) as well as aggression and violent sexual offending (Caputo, Frick, & Brodsky, 1999; Frick & White, 2008). Children with elevated CU traits also show a greater sensitivity to rewards than punishments (O'Brien & Frick, 1996), prefer thrill-seeking activities (Frick, O'Brien, Wootton, & McBurnett, 1994), and show less anxiety related to behavioral difficulties than their peers (Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999) (see Frick & White, 2008, for a review). Research has found that CU traits are relatively stable across childhood and adolescence (Frick & White, 2008; Munoz & Frick, 2007). Given the temperamental characteristics of adolescents with elevated CU traits and the research supporting a connection between CU traits and a range of externalizing behaviors, an adolescents' level of CU traits may be important to consider when predicting sexual risk behavior.

In addition to their connection with externalizing behaviors, CU traits have been found to moderate the relation between parenting (both adaptive and maladaptive parenting behaviors) and a range of delinquent behavior outcomes. Specifically, children high in CU traits seem to be less amenable to behavioral or parenting interventions than their peers. For example, in a study on the relationship between ineffective parenting and conduct problems among children, Wootton and colleagues (1997) found that less effective parenting, including low levels of parental involvement and positive reinforcement and high levels of inconsistent discipline, poor monitoring, and corporal punishment, was associated with conduct problems

only in children without significant levels of CU traits. Children with high levels of CU traits, on the other hand, exhibited a significant number of conduct problems regardless of the quality of parenting that they experienced. In a partial replication and extension of this study, Oxford, Cavell, & Hughes (2003) found that poor parenting was unrelated to problem behavior in children with relatively high scores on a continuous measure of CU traits. Similarly, in a juvenile offender sample, harsh and inconsistent discipline from parents predicted antisocial behavior among adolescents, but only among those with low levels of CU traits (Edens, Skopp, & Cahill, 2008). Elevated CU traits among children are also associated with poorer post-treatment outcomes following parent training interventions for conduct problems (Hawes & Dadds, 2005).

Callous-Unemotional Traits and Adolescent Risky Sexual Activity

Despite a wealth of research supporting the relation between CU traits and conduct problems, few studies have examined relations between CU traits and engagement in risky sex. Problem Behavior Theory (Jessor, 1987), a well-supported explanatory model for explaining adolescent engagement in a range of risk behaviors, emphasizes that both an adolescent's personality as well as engagement in other delinquent behaviors may increase the likelihood of involvement in sexual risk behavior (Jessor, 1991; Kotchick et al., 2001). According to this theory, adolescents with elevated CU traits could be expected to engage in more risky sexual behavior. In one study which measured main effects of CU traits on adolescent risky sexual behavior, Ručević (2010) found small but significant positive relations between CU traits and risky sexual behavior (measured as the frequency with which adolescents

reported engaging in behaviors such as having a one-night stand, maintaining more than one sexual relationship at a time, providing sexual favors for money or drugs, etc.) for both girls and boys in a community sample. However, the majority of the research examining CU traits and sexual behavior among adolescents has been conducted with adolescent sex offenders, rather than with community samples (e.g., Lawing, Frick, & Cruise, 2010; White, Cruise, & Frick, 2009), and findings from studies with adolescent sex offenders may not apply to sexual behavior among community adolescents.

Several research studies have found that parenting practices are a more robust predictor of child and adolescent conduct problems for those low in CU traits as compared to those with elevated CU traits, but CU traits have not yet been examined as a moderator of the relation between parental knowledge adolescent risky sexual behavior. However, if the connection between parental knowledge, CU traits, and risky sexual behavior mirrors the pattern of results found in the literature on parenting practices, CU traits, and delinquent behavior, it is likely that greater parental knowledge and less parent-child discrepancy on reports of parental knowledge would be more protective against engagement in risky sexual behavior for those adolescents with low levels of CU traits than for those with elevated CU traits. Adolescents with lower levels of CU traits may be more likely than those with high CU traits to want parental support and connection, and the lack of a close relationship could be a risk factor for engagement in risky sex, consistent with research which has found that adolescents' perceptions of the parent-child relationship significantly predict risky sexual behavior (Kerpelman, McElwain, Pittman, & Adler-Baeder, 2013).

Adolescents with lower levels of CU traits may also be more responsive to parent-imposed punishments or limit setting. In contrast, for adolescents with high levels of CU traits, the parent-child relationship may not serve as a protective factor against engagement in risky behavior.

Importance of Demographics

Other self-system factors (Kotchik et al., 2001), including demographic variables such as age, gender, and race, are also relevant for understanding an adolescent's likelihood of engagement in risky sexual behavior. Recent data from a national survey by the Center for Disease Control and Prevention (CDC) highlight differences in high schooler's sexual behavior across race, gender, and age.

Regarding racial differences, rates of youth who have had sexual intercourse at all, had sexual intercourse before age 13, or had sexual intercourse with four or more persons are higher among African-American and Hispanic adolescents than among Caucasian adolescents in the United States. However, when reporting on condom use during their last sexual intercourse, 63.4% of African-American adolescents, 55.6% of Hispanic adolescents, and 56.8% of Caucasian adolescents reported that they had used a condom. The same study found that males were more likely than females to report condom use the last time they had sexual intercourse and that more 9th graders reported condom use at the time of last sexual intercourse than did 12th graders (Kann, McManus, Harris, et al. 2015). In addition to their relevance for sexual behavior, these demographic factors relate to parenting practices, with some research finding that adolescents' age and gender are related to reports of parental knowledge

(Keijsers & Poulin, 2013). Demographic factors such as race, age, and gender, should be considered in models of adolescent risky sexual behavior.

Summary and Significance

Risky sexual behavior among adolescents, including engagement in unprotected sex, is common and can result in many negative consequences (CDC, 2013). Extant research suggests that parental knowledge, or the extent to which parents know about their children's activities, whereabouts, and friendships, is a robust predictor of youth risk behavior, including risky sexual behavior (Sneed, Strachman, Nyguyen, & Morisky, 2009; Stattin & Kerr, 2000). Relations between parental knowledge and engagement in risky behavior can vary depending on the reporter of parental knowledge (adolescent or parent) and the particular risky behavior studied (e.g., Padilla-Walker et al., 2008). Furthermore, greater discrepancies between parent- and adolescent- reports of parental knowledge are associated with increased risk-taking behavior among youth, including risky sex (Cordova et al., 2014; Reynolds et al., 2011).

While parental knowledge may be protective against engagement in unprotected sex for many adolescents, parenting practices are typically less potent as predictors of subsequent behavior among youth with high levels of callous-unemotional (CU) traits (e.g., Edens et al., 2008; Hawes & Dadds, 2005). However, no research to date has examined whether CU traits moderate the relationship between parental knowledge and adolescent engagement in unprotected sex. Considering the public health consequences of adolescent engagement in unprotected sex, important directions for future research include 1) to determine whether CU traits

moderate the relation between parental knowledge and adolescents' subsequent engagement in unprotected sex and 2) to do so with an approach which takes into account parent-reported parental knowledge, adolescent-reported parental knowledge, and discrepancies between parent-and adolescent- reports. Results from such research have the potential to increase understanding of the nuanced relation between parental knowledge and adolescents' engagement in risky sexual behavior and to inform future prevention and intervention efforts.

Current Study

The primary aim of the present study was to use a longitudinal design to examine whether an adolescent's level of CU traits moderates the effect of parental knowledge on the likelihood of the adolescent engaging in sexual intercourse without a condom while taking into account relevant demographic factors such as age, gender, and race. Additionally, given the importance of both parent- and adolescent-reports of parental knowledge for predicting adolescent behavior, as well as the meaningful information captured in the discrepancies between these reports (e.g., Cordova et al., 2014; Cottrell et al., 2003; Reynolds et al., 2011), a second aim of this study was to examine these hypothesized conditional effects using adolescent-reported parental knowledge, parent-reported parental knowledge, and informant discrepancies as predictors. To address these aims, the present study utilized data from a longitudinal study involving a community sample of adolescents and their parents. This was the first study to examine whether CU traits moderate the relation between parental knowledge and adolescent's subsequent engagement in unprotected sex. Specifically, I proposed:

Primary Aim: To examine whether an adolescent's level of CU traits moderates the effect of parental knowledge on the likelihood of the adolescent engaging in sexual intercourse without a condom.

Hypothesis 1: Consistent with findings from previous research studies which have found that parenting is a more robust predictor of conduct problems among children and adolescents with low CU traits than those with high CU traits, I hypothesized that the effect of parental knowledge on adolescents' likelihood of engaging in unprotected sexual intercourse would vary as a function of the adolescent's level of CU traits. Specifically, **Hypothesis 1** was:

Greater parental knowledge will significantly predict lower likelihood for engagement in sex without a condom, but only for adolescents with low levels of CU traits. The effect of parental knowledge on engagement in unprotected sex for adolescents with high levels of CU traits will be nonsignificant.

Secondary Aim: To examine the above-mentioned hypothesized conditional effects using three different models, with adolescent-reported parental knowledge, parent-reported parental knowledge, and informant discrepancies as predictors.

Hypothesis 2: Given that past research has not examined how the reporter of parental knowledge affects the interaction between parental knowledge and CU traits as a predictor of sexual risk behavior, I did not have specific hypotheses about how the interaction would vary based on reporter of parental knowledge. Instead, across three models conceptualizing parental knowledge through adolescent report, parent report, and parent-adolescent discrepancies, I tested the hypothesis that the effects of parental knowledge or discrepancies across reporters on adolescents' likelihood of

engaging in unprotected sexual intercourse would vary as a function of the adolescent's level of CU traits. Specifically, I tested these hypotheses:

Hypothesis 2a: Greater adolescent-reported parental knowledge will predict lower likelihood of unprotected sex only for those adolescents with lower levels of CU traits;

Hypothesis 2b: Greater parent-reported parental knowledge will predict lower likelihood of unprotected sex only for those adolescents with lower levels of CU traits;

Hypothesis 2c: There will be a three-way adolescent-report*parent-report*CU traits interaction that significantly predicts adolescent likelihood on engaging in unprotected sex. Greater parent-adolescent discrepancy in reports of parental knowledge will predict greater likelihood of unprotected sex only when parents report greater parental knowledge than their adolescents and only for those adolescents with lower levels of CU traits.

Chapter 2: Research Design and Method

Participants and Procedures

This study involved secondary data analysis with data from one cohort of children and their caregivers (88% mothers and 12% fathers in the original sample) recruited in the Washington D.C. Metropolitan Area to participate in a longitudinal study examining the development of adolescent risk behaviors. The study was initially open to 5th and 6th grade youth proficient in English; no other exclusion criteria were employed. Youth and their families were recruited through media outreach and through postings and fliers at community centers, area schools, libraries, and Boys and Girls clubs. Interested families were screened for proficiency in English and their ability to take part in annual assessments. The initial cohort included 277 youth and their caregivers. Families completed annual assessments over six years.

Study procedures and confidentiality requirements were separately described to parents and youth at each assessment session. All caregivers gave written informed consent to participate in the study, and their children gave assent. Adolescents and caregivers completed annual assessments at the University of Maryland campus and completed computerized questionnaires in separate, private participant rooms. Parents and youth were compensated for study participation. Study procedures were approved by the University of Maryland Institutional Review Board.

Participants were included in analyses if they completed the annual assessments at years 2, 5, and 6 of the ongoing longitudinal study. These waves of data were included specifically because CU traits were only assessed at year 2, and the predictive value of CU traits on risky sexual behavior was assessed later in

adolescence (year 6) in order to increase variability in our outcome of interest (i.e., risky sexual behavior). Parental knowledge was measured at year 5 in order to prospectively predict risky sexual behavior one year later. Additionally, because significantly more mothers than fathers participated in the study, the study only included maternal reports in order to minimize potential confounds. The final cohort for this study's analyses included 135 youth and their mothers after excluding for cases in which relevant data from years 2, 5, or 6 were missing or cases which only included paternal report.

Measures

1. *Demographic Variables.* At the baseline assessment, mothers reported on adolescent demographic information, including adolescent age, gender, and race.
2. *Inventory of Callous-Unemotional Traits – Youth Self Report (Frick, 2004).* At year 2, adolescents completed the Inventory of Callous and Unemotional Traits (ICU; Frick, 2004), which is a 24-item self-report assessment of Callous Unemotional (CU) traits in youth. For each item, participants rated how well a statement describes them from 0 = “Not at all true” to 3 = “Definitely true.” Total scores are obtained by summing all ICU items. Example items from the ICU include: “I feel bad or guilty when I do something wrong,” (reverse coded), “The feelings of others are unimportant to me,” and “I hide my feelings from others.” The ICU has three factors (Uncaring, Callousness, and Unemotional) which all load onto one higher-order CU dimension (Essau, Sasagawa, & Frick, 2006). Total scores on the

ICU have been shown to be related to antisocial behavior, aggression, and delinquency (Kimonis et al., 2008). The ICU showed acceptable internal consistency in the current sample ($\alpha = .78$).

3. *Parental Monitoring Scale (Stattin & Kerr, 2000)*. At year 5, parents and adolescents both completed The Parental Monitoring Scale (PMS).
“Parental monitoring” was initially the accepted phrase for the construct assessed by the PMS; however, the authors of the measure report that unless active monitoring on the part of the parents (e.g., active tracking of adolescent behavior and whereabouts) is measured in addition to parental knowledge, the construct of “parental knowledge” is in fact the most appropriate terminology (Stattin and Kerr, 2000). Thus, the current study refers to the PMS as a measure of *parental knowledge*. The PMS includes both a parent- and adolescent-report version, in which parents are asked to report on their knowledge of their adolescent’s activities, whereabouts, and peer friendships, and adolescents report on their perception of what their parents know in the same content areas. This study used a shortened version of Stattin and Kerr’s measure (2000), comprised of five selected items which were chosen based on previous studies which have utilized a set of similar items considered to be most relevant for adolescents and which are associated with adolescent risk behavior (e.g., Barber, 1996; Brown, Mounts, Lamborn & Steinberg 1993; Jacobson & Crockett, 2000; Roche & Levethal, 2009; Wang, Simons-Morton, Farhart, & Lik, 2009). The five PMS items utilized here are identical to those used in past research by

Reynolds and colleagues (2011). Mothers and adolescents completed the PMS separately and were asked to rate each item according to the extent to which it accurately described their experience. Responses were reported using a 5-point Likert scale (0 = “Never”; 4 = “Always”). Responses were summed to create a total parental knowledge score both for parent-report and for adolescent-report. Items for the adolescent measure included: “Do your parent(s) know what you do during your free time?,” “Do your parent(s) know who you have as friends during your free time?,” “Do your parent(s) usually know what type of homework you have?,” “Do your parent(s) know where you go when you are out?,” and “Do your parent(s) normally know where you go and what you do after school?” Mothers answered the same questions, with minor changes to the wording (e.g., “Do you know what your child does during his or her free time?”). Internal consistencies for the current sample were acceptable to good for both parent-report ($\alpha = .77$) and adolescent-report ($\alpha = .83$). Total scores for both parent-report and adolescent-report on the PMS were utilized in analyses for this study.

4. *Youth Risk Behavior Survey (YRBS; Brener, Collins, Kann, Warren, & Williams, 1995)*. Unprotected sexual intercourse was measured at year 6 using an item from the YRBS that assessed how often the youth had engaged in unprotected sex in the last year. Youth were asked, “In the past year, how many times have you had intercourse with no condom?” and were instructed to choose between the following responses: zero, once, a

few times, 1-3 times per month, 1-3 times per week, and almost every day or more. At year 6 (M age=16.05, SD age=.92), 15.6% of participants reported that they had engaged in sex without a condom in the past year, and 84.4% of participants reported that they had not. Examination of the distribution of scores indicated that the variability was quite low, and this item was thus performing much like a dichotomous variable in our sample. Therefore, responses for this item will be dichotomized into either 0 = “no unprotected sex in past year” or 1 = “yes unprotected sex in the past year” for future analyses. The YRBS has been used widely in research to capture a range of risky behaviors among youth and has demonstrated good validity and test-retest reliability (for a summary of methodological studies conducted to date on the YRBS, see Brener, Kann, Shanklin, Kinchen, Eaton, Hawkins, & Flint, 2013).

Data Analytic Plan

The overall goal of analyses in the present study was to examine whether the effect of parental knowledge on risky sexual behavior was moderated by adolescent CU traits. To test study hypotheses, I ran three different logistic regression models to best assess both adolescent- and parent- perspectives of parental knowledge as well as the discrepancy between these reports. The consideration of parent and adolescent perspectives as well as discrepancies allows for a more comprehensive picture than provided by an individual report alone.

Model 1 examined whether the effect of adolescent-reported parental knowledge (controlling for parent-reported parental knowledge) on adolescents’

likelihood of engaging in sex without a condom was moderated by the adolescents' level of CU traits. Model 2 examined whether the effect of parent-reported parental knowledge (controlling for adolescent-reported parental knowledge) on adolescents' likelihood of engaging in sex without a condom was moderated by the adolescents' level of CU traits. For Models 1 and 2, the MODPROBE Macro version 2.0 for SPSS was used to conduct logistic regression analyses (Hayes, 2015). MODPROBE is an aid for estimating and probing two-way interactions in logistic regression models (Hayes & Matthes, 2009). This Macro estimates unstandardized model coefficients and standard errors for all model variables, including the primary predictor variable, the moderating variable, and covariates. It also produces tests of the conditional effect of the primary predictor variable on the dependent variable at different conditional values of the moderating variable, and it can estimate regions of significance for the effect of the primary predictor variable on the outcome variable as a function of the moderating variable by using the Johnson-Neyman technique (Johnson & Fay, 1950). Logistic regression was used for Model 1 and Model 2, with whether or not the adolescent reported engaging in sexual intercourse without a condom in the past year as the dependent variable in both models. For Models 1 and 2, parental knowledge (as captured by either adolescent-report or parent-report) was the primary predictor variable and total CU traits score was the moderating variable. Predictor and moderator variables were mean-centered to ease with interpretation and probing of interactions. In the case of significant interaction effects, I employed the Johnson-Neyman technique in the MODPROBE Macro to estimate the region of significance for the effect and to plot the results along conditional values of the moderator.

Model 3 tested the predicted effects of reporter discrepancies from Hypothesis 2c. I utilized polynomial regression analyses as recommended by Edwards (1994) as a best practice for testing discrepancy-based research questions. Edwards and Parry (1993) report that studies that have used polynomial regression procedures have indicated that most relationships of interest can be captured using linear or quadratic equations, so this model included both linear and quadratic effects of predictor variables as recommended by these researchers. Predictor variables (parent-report, adolescent-report, and CU traits) were centered (Cohen, West, & Aiken, 2003). Interaction terms created through polynomial regression, which represent variations of informant discrepancy (e.g., high parent-report versus low adolescent-report of parental monitoring) or congruence (e.g., both parent and adolescent report high parental monitoring), provide a more direct test of informant discrepancy hypotheses than do other approaches to testing discrepancies, such as difference scores (Laird & De Los Reyes, 2013). Specifically, the interaction terms in the polynomial regression equation tested whether high (or low) scores from one informant on parental knowledge were more or less strongly associated with the outcome of sex without a condom when parental knowledge scores from the other informant were high (or low) (Laird & De Los Reyes, 2013). In the present study, I was primarily interested in testing the three-way interaction between the parent-adolescent discrepancy on reports of parental knowledge and CU traits; therefore, the polynomial regression model reflected this hypothesis to allow for testing all linear and quadratic main effects of predictor variables, all two-way interactions (parent report parental knowledge*adolescent report parental knowledge; parent report parental

knowledge*CU traits; adolescent report parental knowledge*CU traits), as well as the three-way interaction of interest.

The PROCESS Macro for SPSS (Hayes, 2013) was used to conduct the logistic regression for Model 3. This macro can be used to test mediation, moderation, or mediated moderation models. It was specifically suited to use to test Model 3 because of its ability to use a logistic regression-based path analytic framework to estimating two and three way interactions (Hayes, 2013).

Chapter 3: Results

Preliminary Analyses

As mentioned above, data from adolescents and their mothers who completed assessments at Years 2, 5, and 6 (135 adolescents and their mothers) were included in the present analyses. At year 2 (baseline year for the present analyses), adolescent participants were 12.05 years old on average ($SD = 0.94$, range = 10-14), and at year 6 (final year), adolescent participants were 16.04 years old on average ($SD = 0.92$, range = 14-18). The sample was racially diverse. Fifty-two percent of the children in the sample identified as White, 34% as Black, 4% as Hispanic/Latino, and 10% as “Other.”

Means, standard deviations, and correlations between all continuous study variables are presented in Table 1. Of note, the correlation between adolescent- and parent-report of parental knowledge on the PMS was statistically significant, but small (per effect size conventions; Cohen, 1988), indicating that parents and their children had notable differences in their perceptions of parental knowledge. This is consistent with previous studies which have found that parent and child reports of knowledge are often discrepant, and that the child often perceives the parent to have less knowledge than the parent reports having (Cottrell et al., 2003; Kerr et al., 2010). Additionally, preliminary results showed that adolescents who reported higher levels of CU traits on the ICU reported that their parents had less parental knowledge, as did their parents. Adolescent- report of parental knowledge was negatively correlated with adolescent age.

To examine associations between predictor variables and risky sexual behavior, I ran chi-square tests for association for categorical variables (gender and race) and independent means t-tests for continuous variables (age, mother-reported parental knowledge scores, adolescent-reported parental knowledge scores, and ICU scores) to determine whether there were significant differences on these variables for those adolescents who did not engage in unprotected sex and those who did. Results from these analyses are presented in Table 2. Though a greater percentage of females than males reported engaging in unprotected sex, the gender difference across groups was not significant ($\chi^2(1) = 2.04, p = .15$). However, there were significant differences in race across groups ($\chi^2(4) = 12.07, p = .02$). There was a greater percentage of adolescents from a racial minority (non-Caucasian) background in the group that did engage in unprotected sex (72% of this group was a minority race) as compared to the group that did not (44% of this group was a minority race). There were no significant differences across groups on age ($t(133) = -1.35, p = .18$) or mother-reported parental knowledge ($t(133) = 1.65, p = .10$). However, there were significant differences across groups on adolescent-reported parental knowledge ($t(133) = 2.96, p = .004$) and CU traits ($t(133) = -2.02, p = .046$) in the expected directions based on the extant literature. Specifically, adolescents who did not engage in unprotected sex reported more parental knowledge than those who did. Adolescents who did not engage in unprotected sex also had lower levels of CU traits than those who did.

Primary Analyses

Model 1: Effects of Adolescent-Reported Parental Knowledge and CU traits

The first logistic regression model examined the effects of adolescent-reported parental knowledge and CU traits on adolescents' likelihood of engaging in sex without a condom. Covariates included adolescent age, gender, and race, and the model also controlled for the effect of parent-reported parental knowledge. Results for Model 1 are shown in Table 2. Results revealed a significant main effect of gender, such that girls reported more unprotected sex ($B = -1.24, p = .02$). There was also a significant main effect of adolescent-reported parental knowledge on likelihood of engaging in sex without a condom, such that adolescents who reported that their parents had greater parental knowledge were less likely to engage in sex without a condom in the following year ($B = -.17, p = .03$). However, there were no significant effects of CU traits or the interaction between adolescent-reported parental knowledge and CU traits.

Model 2: Effects of Parent-Reported Parental Knowledge and CU traits

The second logistic regression model examined the effects of parent-reported parental knowledge and CU traits on adolescents' likelihood of engaging in sex without a condom. Covariates included adolescent age, gender, and race, and the model also controlled for adolescent-reported parental knowledge. Results for Model 2 are shown in Table 3. The main effect of gender approached but did not reach significance ($B = -.94, p = .09$). Also, consistent with Model 1, there was a significant effect of adolescent-reported parental knowledge ($B = -.15, p \leq .05$), such that adolescents who reported that their parents know more about their activities and peers

were less likely to engage in sex without a condom. There was also a significant interaction between parent-reported parental knowledge and adolescents' CU traits ($B = -.04, p = .04$). This interaction is displayed graphically in Figure 1, with the y-axis representing estimated log odds of having sex without a condom. I probed this interaction utilizing the Johnson-Neyman technique to determine the region of significance for the effect of parenting on risky sex at various levels of CU traits. These analyses revealed that greater parent-reported parental knowledge was a significant predictor of lower likelihood of engaging in sex without a condom only for adolescents with ICU scores (mean-centered) at or above 4.37 (70.37% of participants scored below this value, 29.63% scored above this value).

Model 3: Effects of Parental Knowledge SDS and CU traits

The final logistic regression model examined the effects of the discrepancy between parent and adolescent reports of parental knowledge and CU traits as well as the interactions between these variables on adolescents' likelihood of engaging in sex without a condom. Covariates included adolescent age, gender, and race. Results for Model 3 are shown in Table 5. In this model, there was a significant main effect of gender ($B = -1.49, p = .02$), such that girls were more likely to report engaging in unprotected sex. A main effect of CU traits approached but did not reach significance ($B = .11, p = .06$). Finally, the interaction between parent-reported parental knowledge and CU traits which was significant in Model 2 did not reach significance in this model ($B = -.04, p = .09$). No other interactions were significant in this model, including linear and quadratic effects of predictor variables as well as the other two-way and the three-way interaction tested. Discrepancies between parent- and

adolescent-reported parental knowledge and the interaction between parent-adolescent discrepancies and CU traits were not significant predictors of adolescents' likelihood of engaging in sex without a condom.

Post-Hoc Analyses

After running Models 1-3, which were designed to test the study's primary hypotheses, I conducted further analyses in response to results of these models. In particular, these follow-up analyses were conducted for two reasons: 1) in order to better understand male and female differences across study variables in response to the significant main effect of gender on engagement in sex without a condom in Models 1 and 3; and 2) to determine whether the pattern of results for each model was consistent after controlling for whether or not the adolescent reported engaging in sex without a condom at year 5, the year before sex without a condom was assessed as the primary outcome for this study (at year 6).

Gender Differences across Study Variables

Means, standard deviations, and percentages of study variables for males and females are presented in Table 6. Independent means t-tests and chi-square analyses were conducted to determine significant differences across males and females on these variables. There was a significant difference in age across groups, such that males were significantly older than females in this study ($t(133) = -2.14, p = .03$). There was also a significant difference in parent-reported parental knowledge across groups, such that parents reported significantly more knowledge about the activities, peers, and whereabouts of girls than boys ($t(133) = 2.37, p = .02$). However, there were no significant differences in adolescent-reported parental knowledge ($t(133) =$

1.55, $p = .12$) or callous-unemotional traits ($t(133) = -1.22, p = .23$) across groups. Racial breakdown across males and females was not significantly different ($\chi^2(4) = 6.55, p = .17$), and there were no significant gender differences in whether or not adolescents engaged in sexual intercourse at all in the past year ($\chi^2(1) = .01, p = .92$) or in sexual intercourse without a condom ($\chi^2(1) = 2.04, p = .15$) in the past year. Taken together, at the univariate level, the only significant differences in study variables across males and females were for age and parent-report of parental knowledge.

Controlling for Past Engagement in Unprotected Sex in Models 1-3

In order to assess for change over time in whether or not an adolescent engaged in sex without a condom, Models 1-3 were replicated, this time controlling for whether or not the adolescent had engaged in sex without a condom in the year prior (reported by the adolescent at the year 5 assessment). Results from these Models are presented in Tables 7-9. Overall, the pattern of results across these Models was similar to the results for Models 1-3. Specifics are discussed below.

When replicating Model 1 and controlling for whether or not the adolescent engaged in unprotected sex in the year prior, the same general pattern of results held, but the main effect of adolescent-reported parental knowledge approached but lost significance ($B = -.15, p = .08$). The main effect of gender was still significant, with girls being more likely to report engagement in sex without a condom ($B = -1.20, p = .04$), and there was a significant main effect of prior engagement in sex without a condom ($B = 2.61, p < .01$), with those who had previously engaged in unprotected sex being more likely to report engaging in unprotected sex at Year 6.

When replicating Model 2 and controlling for whether or not the adolescent engaged in unprotected sex in the year prior, the gender effect observed in Model 1 was still non-significant. As with the replication of Model 1, there was a significant main effect of prior engagement in sex without a condom ($B = 2.71, p < .01$), with those who had previously engaged in unprotected sex being more likely to report engaging in unprotected sex at Year 6. The interaction between parent-reported parental knowledge and CU traits remained significant ($B = -.04, p = .04$), indicating that this interaction was a significant predictor of change in engagement in sex without a condom over time.

Finally, when replicating Model 3 and controlling for whether or not the adolescent engaged in unprotected sex in the year prior, there was significant main effect of gender ($B = -1.38, p = .04$) and prior engagement in sex without a condom ($B = 3.02, p < .01$). Additionally, the interaction between parent-reported parental knowledge and CU traits was a significant predictor of engagement in sex without a condom ($B = -.05, p = .04$), even when controlling for prior engagement in unprotected sex, again indicating that in this model, this interaction was a significant predictor of change in engagement in sex without a condom over time. Neither the discrepancy between parent- and adolescent-reported parental knowledge nor the interaction between this discrepancy and CU traits were significant as predictors of unprotected sex in this model.

Chapter 4: Discussion

The aim of the current study was to examine the longitudinal effect of the interaction between parental knowledge and adolescent CU traits on the likelihood of adolescents engaging in sexual intercourse without a condom. I hypothesized that adolescent CU traits would moderate the relationship between parental knowledge and adolescents' likelihood of engaging in unprotected sexual intercourse such that the protective effect of parental knowledge on risky sexual behavior would be present only for those adolescents with lower levels of CU traits. In contrast, I hypothesized that parenting would not significantly impact risky sexual behavior among youth with high CU traits. An important additional aim of this study was to evaluate the unique effects of both maternal perceptions and adolescent perceptions of parental knowledge as well as the discrepancies between these reports (e.g., Cordova et al., 2014; Cottrell et al., 2003; Reynolds et al., 2011).

Overall, the pattern of findings showed that the relationship between parental knowledge and risky sexual behavior sometimes depended on CU traits, but the reporter of parental knowledge (adolescent or mother) mattered for determining whether greater parental knowledge was protective as a main effect for all adolescents (per adolescent-report) or specifically for those adolescents with elevated levels of CU traits (per parent-report). The region of significance for the interaction between parent-reported parental knowledge and CU traits was counter to the hypothesis that parental knowledge would be more influential for adolescents with lower levels of CU traits. Instead, parental knowledge was protective against engagement in

unprotected sex for those adolescents in the sample with the highest levels of CU traits. These findings and their implications are interpreted and discussed below.

The Importance of Multiple Reporters

Findings from this study clearly indicate the importance of obtaining multiple perspectives (i.e., both parent- and adolescent- perspectives) on parental knowledge in order to best predict adolescents' likelihood of engaging in unprotected sex.

Results from these three models differed based on the specific reporter of parental knowledge, suggesting that adolescents and their mothers do not always perceive or tell an identical story about the extent to which parents are aware of what is happening in their teenagers' lives, and these perspectives uniquely predict sexual risk behavior outcomes. While adolescent-reported parental knowledge was a significant predictor of engaging in risky sexual behavior for all adolescents, parent-reported perceptions of parental knowledge were a significant predictor through their interaction with adolescent CU traits. The effect of parental knowledge on adolescent risky sexual behavior was nuanced and depended, in part, on both the reporter of parental knowledge as well as child-specific personality traits. These results are consistent with at least one other study in which researchers found that parent and adolescent views on parental knowledge differentially predict adolescent risky behaviors (Cottrell et al., 2003).

Although many research studies to date have assessed parental knowledge with only one reporter (e.g., Yang et al., 2007; Yu et al., 2006), recent work has increasingly focused on the importance of *discrepancies* between informants on reports of constructs such as parental knowledge, family quality, and family

functioning (e.g., De Los Reyes, Henry, Tolan, & Wakschlag, 2009; Reynolds et al., 2011). Such discrepancies are found to be stable over time, predict psychological outcomes beyond what can be explained by individual reports alone, and predict response to treatment programs (De Los Reyes, 2011). In the current sample, parent- and adolescent- perceptions of how much parents knew about the adolescents' whereabouts, activities, and peer groups were related to one another ($r = .22, p < .05$) but were not identical. While findings from this study provide further support for obtaining multiple reports of parental knowledge from both parents and adolescents, given that one perspective was a significant predictor of engagement in unprotected sex for the entire sample and the other perspective was significant only for an at-risk subset of the sample, the discrepancy across these reports was not a significant predictor of risky sexual behavior in this sample as a main effect or through its interaction with CU traits.

The Conditional Effect of Parental Knowledge on Adolescent Risky Sexual Behavior

Results revealed that *adolescents' perception* of what their parents know has important implications for predicting risk behavior for *all* youth, regardless of adolescent CU traits. Youth who perceived their parents to have greater knowledge about their activities, peers, and whereabouts were less likely to engage in unprotected sex in the following year. However, this main effect dropped to non-significant ($p = .08$) when controlling for whether or not the adolescent engaged in sex without a condom in the year prior. The protective effect of adolescent-reported parental knowledge observed in this sample is consistent with previous research

which has found that adolescent-reported parental knowledge is associated with more consistent condom use in adolescent boys (Borawski, Ievers-Landis, Lovegreen, & Trapl, 2003) and with prior research that found that lower adolescent perceptions of parental knowledge are associated with risky sexual behaviors among urban, low-income, African-American adolescents (Li, Feigelman, & Stanton, 2000).

Parents' perception of their own knowledge of youths' activities and whereabouts, on the other hand, seemed to matter most for predicting risky behavior among youth who were high on CU traits. Specifically, only for adolescents high in CU traits, having parents who reported high levels of knowledge about their child's whereabouts and activities was protective against engaging in sex without a condom. Furthermore, this result remained significant even when controlling for adolescents' engagement in unprotected sex in the year prior, indicating that parent-reported parental knowledge protected against increases in engagement in sex without a condom for adolescents high in CU traits. The result that parent-reported parental knowledge was most important for adolescents high in CU traits was counter to the initial hypothesis that the impact of parental knowledge would be greatest for adolescents low in CU traits. This initial hypothesis was developed based on previous research results that have indicated that parent-reported parenting practices are a weaker predictor of conduct problems in youth with high levels of CU traits (e.g., Oxford et al., 2003; Wootton et al., 1997). Although the interaction between parental knowledge and adolescent CU traits on risky sexual behavior has not been examined elsewhere, these findings are still inconsistent with previous patterns found in the literature.

One plausible explanation for this counterintuitive finding is that increased parental knowledge perhaps changes other parenting behaviors (e.g., parental monitoring, setting curfews, imposing other restrictions), and that this is particularly salient for parents of adolescents who are at risk for or who are already engaging in risky or problematic behavior. Adolescents with high levels of CU traits tend to have early emerging conduct and behavior problems (Frick & White, 2008), and parents who have high parental knowledge of such risky and problematic behaviors may subsequently increase their monitoring and limit-setting, or decrease teens' privileges and freedoms, which could in turn reduce the likelihood of engaging in unprotected sex over time. Indeed, some research has found an association between parent-directed behavior change strategies (e.g., seeking treatment from a psychologist or counselor, enhancing discipline strategies, establishing more routine and structure) implemented due to parental knowledge of conduct problems and a subsequent decrease in child conduct problems (Pettit, Keiley, Laird, Bates, & Dodge, 2007). For lower-risk adolescents with lower levels of CU traits, parental knowledge may do less to change parenting behavior if the information that parents know about their teens' activities and peers does not present a cause for concern.

Strengths and Limitations

This study makes an important contribution to the literature on parental knowledge, CU traits, and risky sexual behavior, presenting results from three models examining main effects and interactions between parental knowledge and CU traits as predictors of adolescents' engagement in unprotected sex. Notable strengths of this research include a longitudinal study design, the incorporation of both parent- and

adolescent-reports, and consideration of parent-adolescent discrepancies in reporting. Through the use of three different conceptualizations of “parental knowledge,” this study has helped distinguish which aspects of parental knowledge matter for whom when predicting future risky sexual behavior. Additionally, this study focused on the importance of CU traits for predicting risky sexual behavior in a community sample, rather than only among adolescent sexual offenders, as is often the case in much previous research (e.g., Lawing et al., 2010; White et al., 2009). Results highlight the importance of obtaining these different reports and also have the potential to inform the development of intervention and prevention efforts targeting adolescent risky sexual behavior.

Despite the strengths and contributions of this work, the current study includes several limitations that must be considered in the implications of this work and in the development of future research. First, CU traits were only assessed at year 2 of data collection and only assessed through child, and not parent, report. While research has supported the stability of CU traits across adolescence (see Frick & White, 2008, for a review), longitudinal assessment of CU traits over time and concurrently with parental knowledge would allow for an examination of how these processes unfold over time as predictors of risk behavior among youth.

Second, it is worth noting ways in which this sample is similar to and different from other samples with respect to levels of CU traits and engagement in sexual intercourse. Regarding CU traits, the mean total score on the ICU for participants in this study was 22.11 (SD = 8.24). In a study examining the characteristics of the ICU in a large community sample of adolescents (aged 13-18), Essau and colleagues

(2006) reported total ICU means of 27.12 for boys and 21.64 for girls, and in a sample of male and female adolescent offenders, Kimonis and colleagues (2008) reported a mean ICU total score of 23.96. Overall, the levels of CU traits reported by participants in this study are in the range of those reported by other studies, though on the lower end of this range. Regarding sexual behavior, 32.8% of participants in this sample reported engaging in sexual intercourse within the past year. While this is less than the national estimate of 47% of high school students who report engaging in sexual intercourse (CDC, 2013), it is worth noting that the mean age of our sample was 16.04, and it is likely that more of these adolescents will initiate sexual activity between the ages of 16 and 18. Similarly, this sample of adolescents reported relatively low rates of unprotected sex, with 84.4% of adolescents reporting no unprotected sex in the past year. It is unclear if the same patterns would emerge within a more high-risk sample, and thus replication with an at-risk group of adolescents and with a group of older adolescents are important future directions.

A third potential limitation of the current study is that the measure of risky sexual behavior was whether the adolescent had engaged in sexual intercourse without a condom in the past year. While this represents a common sexual risk behavior with significant consequences among adolescents (CDC, 2013), this study did not account for other risky sexual behaviors. Results from this study do not indicate whether parental knowledge or CU traits predict engagement in other types of sexual risk behavior.

This study also does not speak to the role of *paternal* knowledge in predicting engagement in unprotected sex, as maternal reports of parental knowledge were used

exclusively in these analyses. Additionally, while analyses in this study explored the influence of key self-system (e.g., CU traits, gender) and family system (parental knowledge) variables, extra-familial system variables (Kotchick et al., 2001) that to predict engagement in risky sexual behavior such as affiliation with deviant peers (e.g., Lansford, Dodge, Fontaine, Bates, & Pettit, 2014) were not explored. Lastly, the final sample size for this study was modest ($n = 135$), and replicating these analyses, and in particular the polynomial regression analyses which could require more statistical power, with a larger sample could be a direction for future research.

Future Directions for Research

Future work should consider the relationships between CU traits and related conduct problems, risky sex, and a range of parenting behaviors over time, and to do so with large samples over the full course of adolescence so as to determine ideal timing of intervention delivery. This type of research has the potential to clarify whether parental knowledge changes parenting behaviors such as limit setting or parental monitoring and whether particular parenting behaviors prevent engagement in risky sexual activity, or whether the relationships between these variables unfold over time in a different direction. It also has the potential to address limitations of the present study, as results from this study do not indicate *what* high knowledge parents are doing that helps prevent adolescent engagement in risky sexual behavior or *when* they engage in these behaviors. As one example of such research, Caruthers, Van Ryzin, & Dishion (2014) evaluated the influence of a family-centered intervention (the Family Check-Up) on adolescent and young adult engagement in high-risk sexual behavior directly and indirectly through parent-child relationship quality and

change in other family processes. Their results indicated that the direct effect of engagement in this program was not a significant predictor of engagement in high-risk sexual behavior. However, when examined longitudinally, involvement in the Family Check-Up program indirectly resulted in lower levels of high-risk sexual activity over time via the effect that involvement in the program had on family relationship quality. Additionally, the significant effect of improved family relationship quality on high risk sexual behavior was mediated by differences in parental knowledge. Further examination of the relations between parental knowledge, parenting practices, and adolescent risky sexual behavior that also considers the role of adolescent temperamental characteristics such as CU traits represents an important direction for future research.

The current study did not have particular hypotheses with respect to gender, but results indicated a pattern such that, across Models 1 and 3, being female indicated greater risk for engaging in sex without a condom. While the relationships between gender and engagement in sexual intercourse or unprotected sexual intercourse were not significant at the univariate level, gender was a significant predictor of engagement in unprotected sex in Models 1 and 3. Additionally, there was a significant difference in parent-reported parental knowledge, with parents reporting greater parental knowledge for girls than for boys. A literature review by Kincaid and colleagues (2012) suggests that gender is a moderator of the relation between parenting and adolescent sexual behavior. Specifically, their review of extant research findings indicated that parental monitoring may be more protective against engagement in sexual risk behavior for boys, while parent-child emotional

connections and parental warmth may be more important for girls. Gender differences are an important consideration for future work in the area of understanding and developing preventative interventions for risky sexual behavior among adolescents. Future research with large samples may also consider whether gender moderates the interaction between CU traits and parental knowledge in predicting the likelihood of non-condom use.

Conclusions and Clinical Implications

Findings from the current study hold important implications for understanding the nuanced relationship between parental knowledge and adolescent risky sexual behavior. This is the first study to examine CU traits as a moderator of the relationship between parental knowledge and adolescent engagement in unprotected sex. Further, while much research has examined the role of parenting practices in predicting conduct problems and delinquency among youth both high and low on CU traits (e.g., Edens et al., 2008; Oxford et al., 2003; Wootton et al., 1997), much less research has examined the effects of parenting and adolescent CU traits as predictors of risky sexual behavior.

Results indicate that adolescent perceptions of parental knowledge, parental perceptions of parental knowledge, and the discrepancy between these reports varied in their significance as predictors of engagement in sex without a condom. Indeed, for all adolescents, perceiving that their parents had higher parental knowledge was protective against engaging in unprotected sex, suggesting that increasing adolescents' perceptions of how much their parents know about their peers and activities may be an appropriate target for preventative interventions which aim to

reduce risky sexual behavior among adolescents. Such interventions may have success through teaching parents to make their monitoring and surveillance efforts more apparent to their children. For adolescents high on CU traits, greater parental perception of parental knowledge reduced adolescents' likelihood of engaging in sex without a condom. Investigating whether parents' perceptions of their own knowledge changes behavior among parents of adolescents with high CU traits and whether this behavior change in turn reduces sexual risk taking is an important direction for future research with key clinical implications. Lastly, discrepancies between parent and adolescent perceptions of parental knowledge and the interaction between parent-adolescent discrepancies and CU traits were not significant predictors of engagement in unprotected sex in this sample.

Taken together, results from this study highlight the importance of assessing parental knowledge across informants and ultimately suggest that increasing both adolescent and parental perceptions of parental knowledge could be protective in preventing risky sexual practices for youth in general and for particular groups of youth (i.e., depending on CU status). Thus, both parent- and adolescent- perceptions of parental knowledge may be important targets for preventative interventions. Research seeking to develop and test interventions designed to prevent engagement in risky sexual behavior among adolescents should involve parents and should assess for individual differences among adolescents (such as difference in CU traits) to determine which components of interventions of these interventions are useful for whom. Studies which assess parenting-related variables and adolescent temperamental traits from multiple perspectives (e.g., mother, father, adolescent, peer), across multiple time

points, throughout the full course of adolescence have the best potential to inform future intervention and prevention efforts by indicating who should be involved in interventions, the content which should be included, which individuals are more likely to need particular content, and the most effective timing for intervention efforts.

Table 1: *Correlations, Means, and Standard Deviations of Study Variables*

Variables:	1.	2.	3.	4.
1. Adolescent Age at Baseline	--			
2. Adolescent Report PMS	-.21*	--		
3. Parent Report PMS	-.16	.22*	--	
4. ICU Total	-.01	-.32**	-.24**	--
Mean	12.05	13.97	15.30	22.11
SD	.94	3.76	3.24	8.24

** $p < .01$; * $p < .05$.

Note. PMS = Parental Monitoring Scale; ICU = Inventory of Callous-Unemotional Traits.

Table 2: Means, Standard Deviations, and Percentages for Key Study Variables across Groups of Adolescents Who Did and Did Not Engage in Unprotected Sex in the Past Year

	Total Sample (n=135)		
	Total Sample (n=135)	Yes Unprotected Sex (n=21)	No Unprotected Sex (n=114)
Age at Year 6 (M(SD))	16.04(.92)	16.29(.85)	15.99(.93)
Race			
White	52%	28%*	56%*
Black	34%	67%*	28%*
Hispanic	4%	0%*	4%*
Other	10%	5%*	12%*
Gender (% Male)	57%	43%	60%
Adolescent Report PMS (M(SD))	13.97(3.76)	11.81(4.06)**	14.37(3.58)**
Parent Report PMS (M(SD))	15.30(3.24)	15.61(2.94)	15.55(4.25)
ICU Total(M(SD))	22.11(8.24)	25.41(7.29)*	21.51(7.29)*

** $p < .01$; * $p < .05$.

Note. PMS = Parental Monitoring Scale; ICU = Inventory of Callous-Unemotional Traits. There were significant differences in race, adolescent-reported parental knowledge, and callous-unemotional traits among those adolescents who did and did not report engaging in sex without a condom in the past year.

Table 3: *Summary of Logistic Regression Results from Model 1*

Predictor	B	SE	Z	<i>p</i>
Adolescent Age	.38	.30	1.24	.22
Adolescent Gender	-1.24	.55	-2.26	.02*
Adolescent Race	-.04	.19	-.21	.83
Parent Report PMS	-.09	.10	-.85	.39
Adolescent Report PMS	-.17	.08	-2.16	.03*
ICU Total Score	.06	.04	1.50	.13
Adolescent Report PMS*ICU	.01	.01	1.09	.28

* $p < .05$.

Note. Betas reported are unstandardized estimates. PMS = Parental Monitoring Scale; ICU = Inventory of Callous-Unemotional Traits; for Gender, 0 = female, 1 = male; for Race 1 = White/Caucasian, 2 = Black/African-American, 3 = Hispanic/Latino, 4 = Native American/American Indian, 5 = Other.

Table 4: *Summary of Logistic Regression Results from Model 2*

Predictor	B	SE	Z	<i>p</i>
Adolescent Age	.37	.30	1.22	.22
Adolescent Gender	-.94	.56	-1.68	.09 †
Adolescent Race	-.11	.20	-.54	.59
Adolescent Report PMS	-.15	.08	-1.93	.05 *
Parent Report PMS	-.11	.11	-.98	.32
ICU Total Score	.03	.04	.96	.34
Parent Report PMS*ICU	-.04	.02	-1.99	.04*

* $p \leq .05$.

Note. Betas reported are unstandardized estimates. PMS = Parental Monitoring Scale; ICU = Inventory of Callous-Unemotional Traits; for Gender, 0 = female, 1 = male; for Race 1 = White/Caucasian, 2 = Black/African-American, 3 = Hispanic/Latino, 4 = Native American/American Indian, 5 = Other.

Table 5: *Summary of Logistic Regression Results from Model 3*

Predictor	B	SE	Z	p
Adolescent Age	.53	.36	1.48	.14
Adolescent Gender	-1.49	.62	-2.42	.02*
Adolescent Race	-.12	.21	-.58	.57
Adolescent Report PMS	-.11	.11	-.98	.33
Parent Report PMS	-.04	.14	-.30	.76
ICU Total Score	.11	.06	1.86	.06
Adolescent Report PMS ²	.02	.02	1.00	.32
Parent Report PMS ²	.02	.04	.54	.59
ICU Total Score ²	-.01	.01	-1.20	.23
A * P Report PMS	-.01	.03	-.39	.69
A Report PMS * ICU	.02	.01	1.31	.19
P Report PMS * ICU	-.04	.03	-1.68	.09
A * P Report PMS * ICU	.00	.01	.56	.58

* $p < .05$.

Note. Betas reported are unstandardized estimates. PMS = Parental Monitoring Scale; ICU = Inventory of Callous-Unemotional Traits; A * P Report PMS = interaction between Adolescent and Parent Report on PMS; A Report PMS * ICU = interaction between Adolescent Report on PMS and ICU Total Score; P Report PMS * ICU = interaction between Adolescent Report on PMS and ICU Total Score; A * P Report PMS * ICU = three-way interaction between Adolescent Report on PMS, Parent Report on PMS, and ICU Total Score; for Gender, 0 = female, 1 = male; for Race 1 = White/Caucasian, 2 = Black/African-American, 3 = Hispanic/Latino, 4 = Native American/American Indian, 5 = Other.

Table 6: *Gender Differences across Key Study Variables*

	Males (n=77)	Females (n=58)
Age at Year 6 (M(SD))	16.18(.86)*	15.84(.97)*
Race		
White	53%	50%
Black	33%	36%
Hispanic	7%	0%
Other	7%	14%
Adolescent Report PMS (M(SD))	13.55(3.92)	14.55(3.50)
Parent Report PMS (M(SD))	15.64(2.60)*	16.69(2.49)*
ICU Total Score (M(SD))	22.86(7.18)	21.12(9.45)
Sexual Intercourse in Past Year	Yes = 32.5%	Yes = 33.3%
Unprotected Sexual Intercourse in Past Year	Yes = 11.7%	Yes = 20.7%

* $p < .05$.

Note. PMS = Parental Monitoring Scale; ICU = Inventory of Callous-Unemotional Traits. There were significant differences in age and parent-reported parental knowledge among males and females.

Table 7: *Summary of Logistic Regression Results from Model 1, Controlling for Prior Engagement in Unprotected Sex*

Predictor	B	SE	Z	p
Adolescent Age	.22	.32	.66	.51
Adolescent Gender	-1.20	.61	-1.98	.04*
Adolescent Race	.09	.19	.45	.65
Prior Engagement	2.61	.68	3.82	.00**
Parent Report PMS	-.06	.11	-.51	.61
Adolescent Report PMS	-.15	.09	-1.78	.08
ICU Total Score	.04	.04	1.04	.30
Adolescent Report PMS*ICU	.01	.01	1.35	.18

** $p < .01$; * $p < .05$.

Note. Betas reported are unstandardized estimates. Prior Engagement = adolescent report of engagement in sex without a condom in the past year at Year 5; PMS = Parental Monitoring Scale; ICU = Inventory of Callous-Unemotional Traits; for Gender, 0 = female, 1 = male; for Race 1 = White/Caucasian, 2 = Black/African-American, 3 = Hispanic/Latino, 4 = Native American/American Indian, 5 = Other.

Table 8: *Summary of Logistic Regression Results from Model 2, Controlling for Prior Engagement in Unprotected Sex*

Predictor	B	SE	Z	p
Adolescent Age	.18	.31	.59	.56
Adolescent Gender	-.84	.61	-1.38	.17
Adolescent Race	.02	.21	.08	.94
Prior Engagement	2.71	.72	3.79	.00**
Adolescent Report PMS	-.11	.09	-1.32	.19
Parent Report PMS	-.10	.11	-.89	.38
ICU Total Score	.02	.04	.56	.58
Parent Report PMS*ICU	-.04	.02	-1.99	.04*

** $p < .01$; * $p < .05$.

Note. Betas reported are unstandardized estimates. Prior Engagement = adolescent report of engagement in sex without a condom in the past year at Year 5; PMS = Parental Monitoring Scale; ICU = Inventory of Callous-Unemotional Traits; for Gender, 0 = female, 1 = male; for Race 1 = White/Caucasian, 2 = Black/African-American, 3 = Hispanic/Latino, 4 = Native American/American Indian, 5 = Other.

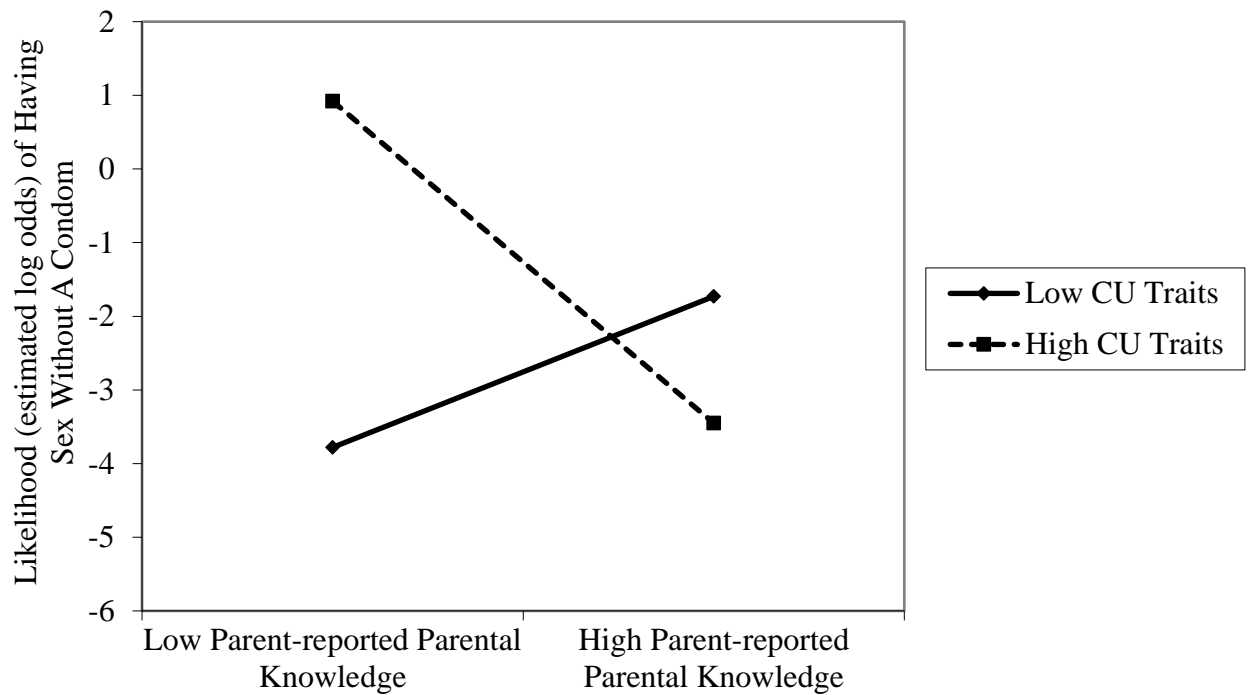
Table 9: *Summary of Logistic Regression Results from Model 3; Controlling for Prior Engagement in Unprotected Sex*

Predictor	B	SE	Z	p
Adolescent Age	.24	.36	.67	.50
Adolescent Gender	-1.38	.67	-2.08	.04*
Adolescent Race	-.00	.22	-.01	.99
Prior Engagement	3.02	.84	3.61	.00**
Adolescent Report PMS	-.10	.12	-.85	.39
Parent Report PMS	.01	.16	.06	.95
ICU Total Score	.11	.07	1.62	.11
Adolescent Report PMS ²	.02	.02	1.17	.24
Parent Report PMS ²	.01	.04	.38	.70
ICU Total Score ²	-.01	.01	-1.35	.18
A * P Report PMS	-.01	.04	-.27	.79
A Report PMS * ICU	.02	.01	1.43	.15
P Report PMS * ICU	-.05	.03	-1.99	.04 *
A * P Report PMS * ICU	.00	.01	.38	.71

** $p < .01$; * $p < .05$.

Note. Betas reported are unstandardized estimates. Prior Engagement = adolescent report of engagement in sex without a condom in the past year at Year 5; PMS = Parental Monitoring Scale; ICU = Inventory of Callous-Unemotional Traits; A * P Report PMS = interaction between Adolescent and Parent Report on PMS; A Report PMS * ICU = interaction between Adolescent Report on PMS and ICU Total Score; P Report PMS * ICU = interaction between Adolescent Report on PMS and ICU Total Score; A * P Report PMS * ICU = three-way interaction between Adolescent Report on PMS, Parent Report on PMS, and ICU Total Score; for Gender, 0 = female, 1 = male; for Race 1 = White/Caucasian, 2 = Black/African-American, 3 = Hispanic/Latino, 4 = Native American/American Indian, 5 = Other.

Figure 1: *Graph of Significant Interaction between Parent-reported Parental Knowledge and Adolescent-Reported CU Traits as a Predictor of Adolescents' Likelihood of Engaging in Sex without a Condom*



Note. Low = 1 SD below mean; High = 1 SD above mean

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